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## A Replicable Approach to Promoting Best Practices: Translating Cardiovascular Disease Prevention Research

Nikki A. Hawkins, PhD<sup>1</sup>, Aunima R. Bhuiya, BSc<sup>1,2</sup>, Sharada Shantharam, MPH<sup>1,3</sup>, John M. Chapel, BS<sup>1,2</sup>, Lauren N. Taylor, MPH<sup>1,2</sup>, Sally Thigpen, MPA<sup>4</sup>, Amara Decker, MPH<sup>5</sup>, Refilwe Moeti, MA<sup>1</sup>, Stephanie Bernard, PhD<sup>1</sup>, Chris Jones, PhD<sup>1</sup>, Michael Schooley, MPH<sup>1</sup>

<sup>1</sup>Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Atlanta, GA, USA

<sup>2</sup>Oak Ridge Institute for Science and Education, Oak Ridge, TN, USA

<sup>3</sup>IHRC, Inc., Atlanta, GA, USA

<sup>4</sup>Centers for Disease Control and Prevention, National Center for Injury Prevention, Atlanta, GA, USA

<sup>5</sup>The Ohio State University College of Medicine, OH, USA

### Abstract

**Objective:** Significant delays in translating healthcare-related research into public health programs and medical practice mean that people may not get the best care when they need it. Regarding cardiovascular disease, translation delays can mean lives may be unnecessarily lost each year. To facilitate the translation of knowledge to action, we created a Best Practices Guide for Cardiovascular Disease Prevention Programs.

**Design:** Using the Rapid Synthesis Translation Process and Best Practices Framework as guiding frameworks, we collected and rated research evidence for hypertension control and cholesterol management strategies. After identifying best practices, we gathered information about programs that were implementing the practices, and resources useful for implementation. Research evidence and supplementary information were consolidated in an informational resource and published online. Web metrics were collected and analyzed to measure use and reach of the guide.

**Results:** The Best Practices Guide was released in January 2018 and included background information and resources on eight best practice strategies. It was published as an online resource, publicly accessible from the CDC website in two different formats. Web metrics show that in the first year after publication, there were 25,589 webpage views and 2,467 downloads. A query of partner use of the guide indicated that it was often shared in partners' own resources, newsletters, and online material.

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**Corresponding Author:** Nikki A. Hawkins, PhD, Centers for Disease Control and Prevention (CDC), National Center for Chronic Disease Prevention and Health Promotion, 4770 Buford Highway NE, Mailstop F73, Atlanta, GA 30347 (nhawkins@cdc.gov).

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**Conclusion:** In following a systematic approach to creating the Best Practices Guide and documenting the steps taken in its development, we offer a replicable approach for translating research on health care practices into a resource to facilitate implementation. The success of this approach is attributed to three key factors: using a prescribed and documented approach to evidence translation, working closely with stakeholders throughout the process, and prioritizing the content design and accessibility of the final product.

### Keywords

hypertension; cardiovascular; knowledge translation; best practices; implementation

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## Introduction

One of the major weaknesses known to plague health-related scientific discoveries involves significant delays in translating knowledge to action. While it's difficult to quantify how long it takes for a research discovery to be adopted into practice, there is widespread recognition that it can take 17 years or longer.<sup>1</sup> Time lags for study replication and examining an intervention's long-term effects are necessary to avoid promoting ineffective or harmful practices; however, extensive delays for other reasons can come at a significant cost to the population.<sup>2–4</sup> Delays in research translation on prevention strategies for common diseases such as cardiovascular disease can mean thousands of lives lost unnecessarily each year, highlighting the need for standardized approaches to expeditiously translate research into practice.

### Case in point: Controlling Blood Pressure and Managing Cholesterol

Cardiovascular disease (CVD) is the leading cause of death in men and women in the United States.<sup>5</sup> There is an urgent need for health systems research on the prevention and control of cardiovascular disease to improve patient outcomes and risk factors. Treatments for two key risk factors—hypertension (high blood pressure) and hyperlipidemia (high blood cholesterol)—are effective and relatively inexpensive, however most people with these conditions do not have them under control.<sup>6</sup> The research on lowering blood pressure and cholesterol levels through improved interventions and services offers insights about effective practices, but more work is needed to translate this evidence into action. Despite the existence of systematic reviews and guidelines on effective strategies for CVD prevention and treatment, recommended practices are not always adopted.<sup>7</sup>

### Knowledge translation and Implementation Science

The fields of knowledge translation (KT) and implementation science (IS) recognize that the publication of research findings and guidelines, alone, often does not lead to changes in practices and policies due to the challenges in adoption of new practices. KT focuses on eliminating practical barriers and identifying effective paths to the uptake of evidence-based practices.<sup>8</sup> The field of IS focuses further on the engagement of key stakeholders at multiple levels to identify factors that impact the uptake of new interventions and programs.<sup>9</sup> While interest in KT and IS has exponentially grown within the medical sciences over the past two

decades, there remains a need for replicable and practical approaches to facilitate moving research findings into the hands of individuals and organizations that can put them to use.

In line with the Centers for Disease Control and Prevention's (CDC) mission to improve cardiovascular health of the population, we sought to identify a replicable process for translating research on blood pressure control and cholesterol management into a user-friendly, implementation-oriented resource for public health practitioners, health care professionals, and program specialists. We focused on highlighting practices that can be implemented in health systems (i.e., CDC's chronic disease Domain 3 focus) and through partnerships with community programs (i.e., CDC's chronic disease Domain 4 focus). The primary challenges recognized at the outset of this project were: (1) identifying practices most ready for widespread implementation; and (2) ensuring the resource guide would be user-friendly and accessible to the target audience. The ultimate goal of our efforts was to create an informational guide containing best practices for cardiovascular disease prevention programs (hereafter called the "Best Practices Guide"<sup>10</sup>) that would highlight effective hypertension and hyperlipidemia control and management strategies that are ready for widespread implementation in the field. In this paper, we describe the approach our development team took to create the Best Practices Guide. Our approach employed several existing translation products (Figure 1) and could be replicated within a different disease state or subject area. In this paper we also describe how we measured the preliminary reach achieved by publishing this resource online.

## Method

### Why: The best practices framework

The development team used the *Best Practices Framework (BPF)*<sup>11</sup> to guide the identification and selection of best practices for hypertension (Figure 2). The framework provides a taxonomy for classifying public health practices on two interrelated components: (1) public health impact; and (2) evidence quality. Public health impact includes five elements: *effectiveness*, *reach*, *feasibility*, *sustainability*, and *transferability*. Quality of evidence ranges across *weak*, *moderate*, *strong*, and *rigorous*. Based on these components, public health practices can be categorized as *emerging*, *promising*, *leading*, or *best*. *Best* practices are those that have high-quality evidence to support their effectiveness and also demonstrate a positive potential for public health impact. A strategy's designation may change when new evidence becomes available.

### What: The rapid synthesis translation process

The Rapid Synthesis Translation Process (RSTP) was used as a guiding framework for the process of developing the Best Practices Guide (Table 1). Created by CDC scientists, the framework consists of six key steps to expedite the transfer of research knowledge to end-users.<sup>12</sup> Table 1 shows the six steps of the RSTP with a related explanation on how each step was operationalized in the development of the Best Practices Guide. The key steps include: (1) soliciting suggested topics by end-users, (2) scanning the findings, (3) sorting for relevance, (4) synthesizing results, (5) translating for end-users and, (6) review by end-users

and experts. These steps bring the end-user into the process of KT from the beginning to ensure relevance of the final product.

### End-user engagement

Thirteen partners and anticipated end-users who were invited to provide review included: (1) federal funding recipients; and (2) subject matter experts (SMEs) in cardiovascular disease, public health administration, clinical services delivery, and KT. The end-users were invited to participate based on their expertise in the subject matter at hand and the anticipated likelihood of their organization's interest in the Best Practices Guide. There were two phases of end-user engagement. During phase one, end-users reviewed documents that described the project background, justification, goals, and a list of potential best practice strategies. Input on the documents was encouraged via email and during a virtual review panel meeting. Phase two occurred after evidence had been reviewed and a completed draft of the guide was available. At that time, six of the same or closely affiliated end-users were invited to review and comment on the draft.

### How: Reviewing evidence strength

To operationalize the Best Practice Framework concepts, we relied on the Continuum of Evidence of Effectiveness tool developed by CDC (hereafter called the "Continuum Tool"). This is a practical tool developed for public health practitioners to determine the strength of the best available research evidence on a program, practice, or policy (see figure, Supplemental Digital Content 1).<sup>13</sup> The Continuum Tool ensured that a consistent and standardized approach was used to assess each strategy.

The continuum is organized by six dimensions of the evidence strength (*effect; internal validity; type of evidence/research design; independent replication; implementation guidance; and external and ecological validity*). It has three evidence strength categories (*Well Supported/Supported; Promising/Emerging/Undetermined; and Unsupported/Harmful*). Reviewer input serves to determine the evidence strength and assign a corresponding strength category for each dimension. Reviewers drew the evidence base from peer-reviewed publications and systematic reviews such as The Guide to Community Preventive Services (The Community Guide). Two reviewers with expertise in the assigned strategy used the Continuum Tool to rate the evidence base. Any discrepancies between the reviewers' results were resolved through discussion to reach consensus on each rating.

### Assessing health impact

To address feasibility, reach, and sustainability, an additional evidence review by the project team assessed whether there was sufficient research evidence available to indicate whether the strategy had demonstrated positive impact on public health, health disparities, and economics (see figure, Supplemental Digital Content 2). The health impact category indicated whether the strategy achieved positive outcomes, such as lowered blood pressure or increased medication adherence. The health disparity impact category determined whether the strategy was found to be effective among disadvantaged and high-risk populations. And the economic impact category reflected whether the strategy could achieve a positive economic impact, such as being cost-effective. For each category, evidence

reviewers assigned the strategy a *Supported*, *Moderate*, or *Insufficient* rating. Strategies were rated as *Supported* if they had one or more published systematic reviews with evidence of efficacy. Strategies with multiple studies showing a positive impact but no consensus from a systematic review were labeled *Moderate*; and those with limited or no evidence showing a positive impact were rated *Insufficient*.

## Design

Maximizing the usability and relevance of the Best Practices Guide was identified as a priority and offering case-studies or examples of implementation is one approach for doing this. We provided examples of strategy implementation in a section titled “Stories from the Field.” Working with partners and SMEs, we solicited recommendations of programs implementing the strategies. We also collected information from websites about how each program operated and the observed outcomes.

To ensure that the Best Practices Guide was visually appealing and easy to navigate, we consulted literature and SMEs from the field of content strategy. Experts in this field contend that four key questions should guide a product’s design: (1) What is the content *substance*?; (2) What is the content *structure* and how should it be presented to the audience?; (3) What is the detailed *workflow* associated with the content’s development?; and (4) What content *governance* is in place to ensure the content is consistent and organized?.<sup>14</sup> For *substance*, we determined that we wanted the guide to be evidence-based, informative, and concise, so that end-users could use it as a resource and reference to other resources. The *structure* component determined the content’s organization. The *workflow* was guided by existing translation tools and products (Figure 1). And, finally, *governance* involved maintaining standards from the early development phase. A design scheme involving colors, fonts, layouts, and photos created a coherent look to the guide.

The design process was separated into three phases: conceptualizing the design; designing the layout and template using Adobe InDesign (CC 2015.4, Version 11.4 Adobe Inc., 2016);<sup>15</sup> and formatting the template with the final text and images. User insight informed the design with respect to usability, clarity, consistency, and relevance.<sup>16</sup> Comments and suggestions from end-users also informed our eventual decision to format the guide into a portable document format (PDF) and an interactive web-based version. Some end-users requested a printable PDF version, and the web-based version was created to promote interactivity, increase discoverability, and extend the reach and impact.

## Dissemination and evaluation

A targeted approach to dissemination was essential. The Best Practices Guide was anticipated to be the first of its kind to promote health care systems interventions within the field of cardiovascular disease in the U.S., and we spent time specifying key audiences, call-to-action, and dissemination channels. We developed a timeline that identified relevant monthly health observances, conferences, and public health webinars. We conveyed information through the customary communication channels with CDC-funded state and local health departments given the importance of these groups as end-users.

To evaluate our dissemination efforts, we analyzed web metrics with Adobe Analytics, version 5.6.21 (Adobe Inc., San Jose, CA).<sup>17</sup> Our analyses attempted to answer questions related to reach, including: (1) is the best practices guide of interest and gaining the attention of the target population?; (2) which strategies are generating the most interest?; and (3) which modes of dissemination generated the most attention?

## Results

### End-user engagement

More than 15 individuals reviewed the Best Practices Guide during its development. Reviewers included recipients of CDC funding for heart disease programs; translation and dissemination researchers; and national non-profit organizations focused on CVD, public health program management and delivery. In phase one, reviewers provided input during a 90-minute webinar on the proposed subject, scope, and content. In phase two, reviewers provided written feedback on a complete draft of the Best Practices Guide. Feedback from the reviewers was used to revise the guide outline, content matter, and final draft.

### Identifying best practices

**Continuum tool results.**—Of over 15 potential best practice strategies nominated for review and consideration, preliminary literature reviews revealed that only eight had adequate research evidence available for evaluation using the Continuum Tool. During the course of additional literature review and evaluation using the Continuum Tool, it became clear that two of the strategies being reviewed had most often been investigated together within the same research studies and should be combined. Additionally, one of the strategies that included multiple components was most often studied as two separate interventions, and thus, was separated into two different strategies. After combining two strategies and separating one strategy into two, there remained eight final strategies in the final review process.

Based on the review results, all eight strategies achieved the highest rating (*Well-Supported/Supported*) in the categories of effect, internal validity, research design, independent replication, and external/ecological validity. Within the category of “implementation guidance,” which focuses on how readily available implementation guidance is for the strategy, only five strategies received the highest rating, while three strategies were rated as “promising/emerging.” The lower ratings in these cases indicated that implementation guidance was not readily found for that particular strategy within the research literature or environmental scans. While the availability of implementation guidance is certainly a facilitator of translating knowledge to action, a decision was made to continue evaluating all eight strategies as potential best practice strategies.

**Health impact review results.**—Based upon the extent of available evidence, seven of the eight strategies were determined to be *Supported* in the health impact category while one was rated *Moderate*. For economic impact, five were rated *Supported*, one was rated *Moderate*, and two were rated *Insufficient*. For health disparity impact, three were rated *Supported*, one was rated *Moderate*, and four were rated *Insufficient*. Overall, two of the



eight strategies were rated as *Supported* across all three public health impact categories. Four strategies were rated as *Supported* in two of the three categories, with health disparity impact being the category most often not given the highest rating. All strategy ratings within the Best Practices Guide are summarized pictorially in Figure 4. While only two strategies met the top-tiered criteria in all three public health impact categories, the remaining six strategies were retained even though they received lower ratings for lack of available evidence.

### Design and webpage development

The Best Practices Guide was enhanced by multiple visual features, including a cohesive and vibrant color scheme; high quality and natural-looking photos; variations in text orientation and page layout; and meaningful iconography (see table, Supplemental Digital Content 3). These stylistic elements from the PDF version of the Best Practices Guide were modified for use in the interactive web-version. Each of the eight strategies has its own webpage. Easy-to-navigate tabs offer direct access to the strategy sections on public health, health disparity, and economic impacts; Stories from the Field; and considerations for implementation. Additionally, users can download an entire document (PDF) version of the guide or individually formatted sub-sections.

### Dissemination and Evaluation

Within weeks of its initial launch on the CDC website, the Best Practices Guide was featured at a national research conference,<sup>18</sup> sent to CDC and external partners, shared on social media (Facebook, Twitter, and LinkedIn), and presented at workgroups and webinars. The first webinar reached full capacity with over 250 attendees, and the second webinar had roughly 70 attendees. Partners continued to disseminate the guide, such as incorporating links to the guide into their own toolkits, guides, electronic digests and blog posts, websites, and other communication materials.

Within 12 months after the launch of the Best Practices Guide website, the combined pages had over 25,000 views. Table 2 shows specific metrics and results for the first year's launch. The main landing page, *Best Practices for Cardiovascular Disease Prevention Programs* had over 11,000 views and the landing pages that focused on *Community Pharmacists and Medication Therapy Management*; *Implementing Clinical Decision Support Systems*; and *Self-Measured Blood Pressure Monitoring with Clinical Support* each had over 2,000 views. While most viewers got to the guide by using a search engine or typing the URL directly, the top three external referrers included Medscape, The Community Guide, and The American Pharmacists Association. In total, the PDF version was downloaded 2,467 times between January 1<sup>st</sup>, 2018 and December 31, 2018.

There were a total of 100,908 impressions from tweets that mentioned the guide by the Health and Human Services' Million Hearts® (@MillionHeartsUS) and CDC's Division for Heart Disease and Stroke Prevention (@CDCHeart\_Stroke) twitter accounts. Additionally, compared to the first and last days of the month, there were approximately five times as many downloads of the guide on February 14<sup>th</sup>, one day after CDC's Acting Director tweeted about the guide.

## Discussion

While translating knowledge to action is a lauded and much-needed activity in public health today, it is not always clear where to begin and which approach to follow. By relying on existing theoretical frameworks, research evidence, and translation tools, we developed an approach for creating a Best Practices Guide from best available evidence. The guide was accessed thousands of times by over 15,000 individuals in the first year after its publication online.

Developing the Best Practices Guide was a large undertaking with countless decision points and a timeline that spanned multiple years. Despite its complexity, three key guiding principles were central to its development. First, it was important to the integrity of the project that we followed a prescribed and documented process to identify, rate, and summarize evidence about the strategies. For example, requiring systematic input from end-users at prescribed time points, having two expert reviewers per strategy use an evidence review tool to evaluate research evidence, and documenting feedback and decision points, all ensured that the resulting Best Practices Guide was the product of a rigorous and replicable process.

Second, we maintained a focus on end-user engagement throughout the entire translational process. The RSTP specifies that formal engagement from end-users should occur at two times during the development of a project, which was incorporated into the design of the current approach. End-user input was reflected in the *Stories from the Field* section that came out of partner requests for “on the ground” examples; in the design decisions made to maximize accessibility; and during the dissemination phase when we conducted a second webinar and tailored it to end-user requests.

Third, in contrast to traditional scientific publications that place little value on the aesthetic aspects of a document, we made content design a major focus of the guide. We aimed to deliver the scientific and practical content of the guide in a way that was visually appealing, user-friendly, and easily accessible to target audiences. Taking lessons from fields like content strategy, which use advanced methods for information delivery, we considered the way in which our information would be used and retrieved by end-users to be nearly as important as the content itself. This extra emphasis on design and delivery required additional resources and efforts to consult individuals with varied skillsets and expertise, but it resulted in a product that was more user-friendly and accessible than if such individuals had not been consulted.

While the described approach to creating the Best Practices Guide entails novel and replicable strategies for translating evidence into action and facilitating implementation, several considerations about the guide and limitations in our ability to assess its success should be noted. First, research evidence is constantly changing and information published subsequent to our reviews has the potential to impact the results highlighted in the Best Practices Guide. For this reason, revisiting the literature periodically and updating this resource will be an essential component of keeping the Best Practices Guide up-to-date and relevant. Second, while the ratings given to strategies within the guide provide a general



indication of whether research has tested the strategies' efficacy for health, equity, and economic outcomes, they do not indicate the degree of impact. Identical ratings across strategies do not indicate identical outcomes (e.g., that they both increase medication adherence or are equally effective in all populations). Thus, the ratings cannot be used to compare the effectiveness of the various strategies. There also exist limitations in our ability to thoroughly evaluate the guide's success. Early web metrics show positive signs regarding interest and accessibility, but more work is needed to better understand the guide's usefulness to the intended users and its effectiveness in facilitating implementation. Currently, plans are underway to better assess decisions about implementing or adapting programs or policies that have been aided by the guide but these efforts will be labor-intensive and difficult to quantify. A final limitation in assessing the guide's success involves considering the source of its publication. The CDC funds all 50 states and the District of Columbia to reduce the burden of cardiovascular disease in the United States. Awardees are accustomed to seeking guidance from the CDC in order to meet funded program goals. Although the Best Practices Guide is not considered official funding guidance, it was clear from questions received during webinars that some end-users viewed this guide as potentially providing insights on funding requirements and were likely interested in learning about it for that reason.

In summary, there is a need for translation of research evidence to action and tools to facilitate implementation, but a lack of practical guidance on the steps required to initiate and carry out the process of translation. The development process we used to create the Best Practices Guide is one promising approach to consolidating the best available evidence in a particular disease area and translating this information into a practical and accessible format. Although this approach can be time-consuming and may not result in a resource with all information needed for implementing the strategies, it is a first step in knowledge translation and garnering awareness of effective strategies to program planners, payers, and policy makers who are interested in investing in evidence-based approaches to improve health.

## Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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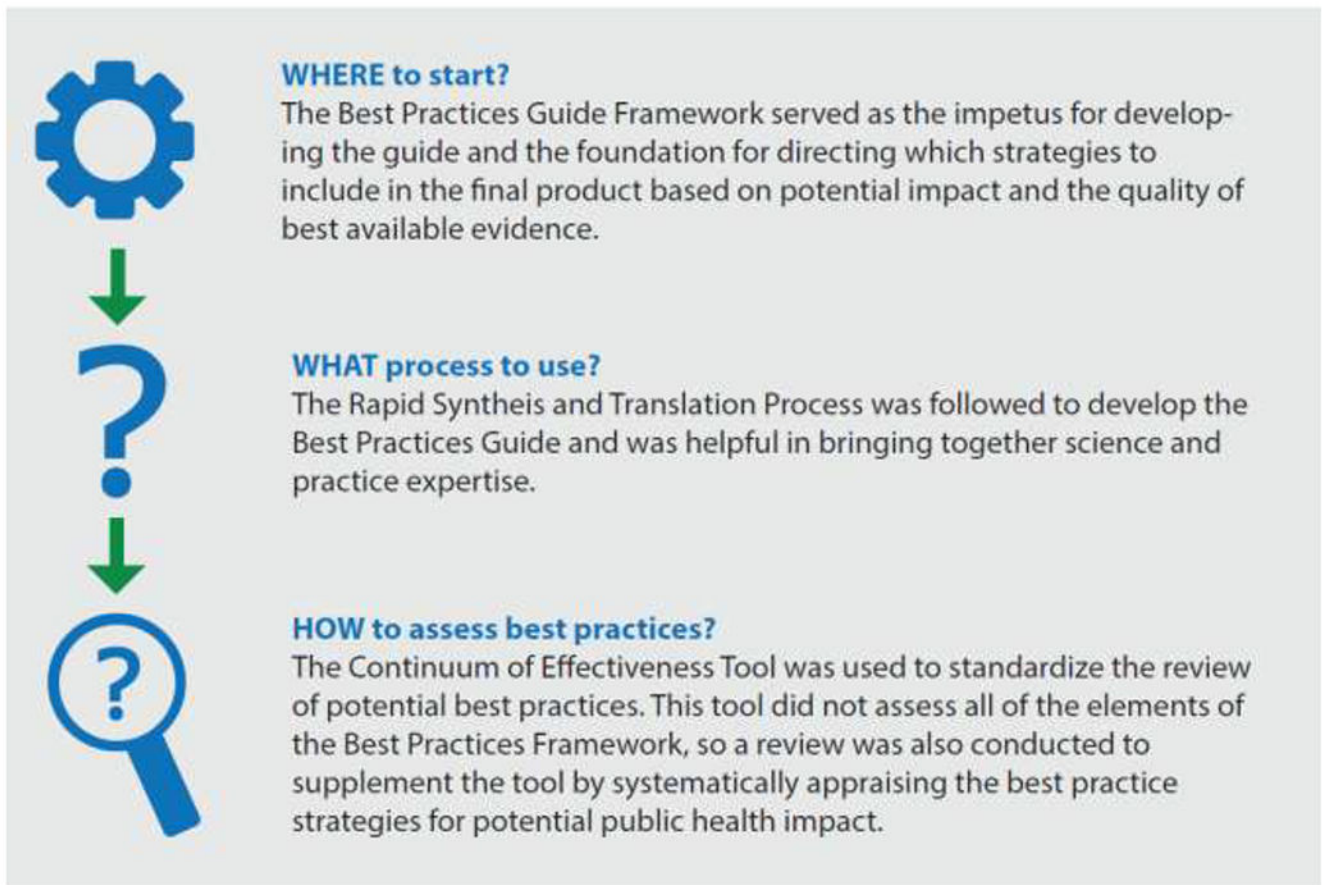
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**Implications for policy and practice**

- More guidance is needed on practical approaches to translate evidence into action. The approach that we used to develop the Best Practices Guide is described in detail so that it could be replicated within a different disease state and other subject areas.
- Engaging end-users throughout this translation process was instrumental in developing a resource that was useful to health care practitioners at state and local health departments, other public health professionals, researchers, and program specialists.
- Highlighting evidence-based strategies with contextual information such as resources for implementation and policy and law-related factors provides end-users a broader understanding of the evidence before implementing strategies into practice-based settings.



**Figure 1.**  
Employing Existing Translation Products in the Development of the Best Practices Guide



**Figure 2.**  
A Conceptual Framework for Planning and Improving Evidence-Based Practices<sup>11</sup>

**Table 1.**

## Using the Rapid Synthesis Translation Process (RSTP) in Developing the Best Practices Guide

<b>RSTP Step</b>	<b>How the RSTP Step was used in the Best Practices Guide</b>
Step 1: Solicit Topics from End Users	End-users were defined as health care practitioners at state and local health departments (especially those receiving CDC-administered funds), other public health professionals, content SMEs, and program specialists. The development team recruited individuals from each of these perspectives to provide input at the project's outset.
Step 2: Scan Findings	The development team reviewed the research literature to identify evidence-based strategies for lowering high blood pressure and cholesterol levels that can be implemented in health care systems and community programs linked to clinical services. The strategies determined to be potential best practices were moved to step 3.
Step 3: Sort for Relevance	Criteria for including strategies in the Best Practices Guide were determined according to a vetting process that considered literature review findings, agency priorities, and input from SMEs.
Step 4: Synthesize Results	A team of evidence reviewers (SMEs in the field) used the Continuum of Evidence of Effectiveness tool <sup>11</sup> to assess the strength of evidence behind the identified strategies. The Continuum Tool uses answers to a series of questions about each strategy to rate overall evidence strength. Once completed, strategies with ratings in the highest category (i.e., supported or well-supported) were considered for the Best Practices Guide. Strategies were then reviewed for alignment with the Best Practices Framework to assess their potential to improve cardiovascular health, reduce health disparities, and demonstrate economic sustainability.
Step 5: Translate to End User(s)	The Best Practices Guide development team used the data collected from the Continuum Tool assessments, the Best Practices Framework review, and additional input from SMEs to draft the translational product, <i>The Best Practices Guide for Cardiovascular Disease Prevention Programs</i> .
Step 6: Review by End User(s)	Standard processes for clearance by CDC and the US Department of Health and Human Services were initiated after additional review by a panel of funding awardees, SMEs, and other potential end-users.



**Table 2.**

## Web Metrics on Views and Downloads of the Best Practices Guide

<b>Metrics</b>	<b>Definitions<sup>18</sup></b>	<b>Results (January 1 – December 31, 2018)</b>
Unique (New) Visitors	Number of unduplicated visitors to the website	15,475
Page views/visits	Total number of visits to any of the best practices web pages (overview page or strategy-specific pages)	25,589
Time spent on website	The average amount of time a visitor spends on any one of the best practices guide web pages	3 minutes, 8 seconds
Bounce rate	The percentage of visits with only a single click	33%
Referring Types	The domain or URL accessed by the visitors immediately before arriving to the website	Search Engines (60%) Typed/Bookmarked (21%) Other Websites (15%) Social Media (4%)
File Downloads	Number of times a complete section of the best practices guide was opened, saved, and downloaded, including the complete URL required to access the file	2,467